

Permit Conditions for Electron Capture Detectors

Background

Authority to possess and operate an Electron Capture Detector (ECD) containing a radioactive source is granted to an individual by the Radiation Safety Committee after the user's application has been reviewed and approved by the USDA Radiation Safety Staff (RSS).

It is the responsibility of the Permit Holder named on the Radiation Source Permit to comply with all safety and regulatory requirements of the Nuclear Regulatory Commission and the USDA Radiation Safety Program.

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Acquisition

Purchase orders for electron capture detectors or for gas chromatographs containing an ECD must be approved by the Radiation Safety Staff prior to the order being placed by a purchasing agent.

A Permit Holder must receive the prior approval from the RSS before an ECD is transferred from another licensed or permitted individual.

Upon receipt of any ECD, the following information must be submitted to the RSS:

- Sealed Source Inventory Record (RSS-28);
- A copy of the manufacturer's initial leak test results (if available); and
- A copy of the manufacturer's information and specifications.

Authorized Users

Only the Permit Holder and the Associate Users listed in the Radiation Source Permit are authorized to install, remove, or leak test the ECD.

Other individuals in the laboratory may operate a gas chromatograph with an ECD installed after they have received appropriate training from the Permit Holder.

Leak Tests

A leak test of an ECD containing nickel-63 (Ni^{63}) must be performed at intervals not to exceed six months.

The test must be performed in accordance with the manufacturer's instructions, or by wiping the gas intake and outlet surfaces.

NOTE: Never attempt to directly wipe the inner surface of the component containing the radioactive material. This might cause the ECD to fail and will contaminate the ECD, the gas chromatograph and the surrounding area.

Never open the detector cell for any reason.

The RSS will supply leak test kits, perform the required analysis, and report the results back to the Permit Holder. The Permit Holder can use other companies to perform and analyze the leak test provided they are properly licensed to perform that service. It is the responsibility of the Permit Holder to provide a copy of the vendor's license for RSS to verify.

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Leak Test Limits

A sealed source has failed the leak test when the contamination on the filter paper used for the test exceeds 0.005 μCi (11,100 DPM). Devices exceeding this level are to be removed from service, and returned to the manufacturer for repair, replacement, or disposal. The RSS must be notified immediately if the leak test limit is exceeded in order to notify the NRC and to contact the manufacturer to determine if special shipping requirements are necessary.

The USDA ALARA program uses one other limit to monitor the performance of these tests.

- 1,110 DPM (10% of the limit) is a notification level. Users of devices exceeding this level will be notified of the test results to make them aware of the potential for source failure in the future.

Routine Operation and Maintenance

All servicing or cleaning of an ECD must be performed by the manufacturer or by an authorized representative of the manufacturer.

Transfers of ECDs to companies for cleaning or maintenance must receive the prior approval of the RSS since this is a transfer of possession. Also, the company often supplies a different ECD in return, requiring the user to update their inventory record with RSS.

Posting of Signs and Labels

Any room or area containing an ECD must be posted with a sign having the words "Caution - Radioactive Materials". These signs are available from the Radiation Safety Staff. The room containing the ECDs must be posted with an NRC Form-3 "Notice to Employees".

Each ECD must have a tag or a label securely attached having the words "Caution - Radioactive Materials" clearly visible. The radioisotope, activity, and measurement date must also be listed.

Special Requirements for ECDs Containing Hydrogen-3

Detector cells containing hydrogen-3 (H^3) must be vented:

- Directly to the outside of the building, or
- To a continuously operating chemical fume hood.

Detector cells containing titanium tritide or scandium tritide foils must only be used in conjunction with a properly operating temperature control mechanism which prevents the foil temperature from exceeding its design specifications.

Leak tests are not required for ECDs containing hydrogen-3.

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**Storage of
Unused ECDs**

A detector cell that has been removed from a gas chromatograph must be stored in a locked cabinet or drawer. The drawer front must be labeled with a "Caution - Radioactive Materials" label or sign.

Flammable materials must not be stored in the same area as ECDs.

The room containing the ECDs must be posted with a "Caution - Radioactive Materials" label or sign and a NRC Form-3 "Notice to Employees".

**Transfer of
ECDs**

The RSS must be notified in writing of a user's intent to transfer an ECD to another USDA Permit Holder, to a licensed individual covered by a different NRC or Agreement State license, or to return the ECD to the manufacturer for cleaning or service.

The transfer can be accomplished only after the written approval of the RSS is received by the Permit Holder.

**Disposal of
Unused ECDs**

The disposal of ECDs is recommended when the research or program requirements no longer require its use.

The proper disposal of unused ECDs is required. In most cases, the original manufacturer of the ECD will accept the return of the device.

Prior to disposing of any ECD, the Radiation Safety Staff must be notified. This allows the RSS to:

- Perform a records check;
- Verify that a current leak test is available for the device prior to shipping;
- Determine if the manufacturer has any special shipping or packaging requirements; and
- Amend the user's radioactive materials permit.

The disposal can be accomplished only after the written approval of the RSS is received by the Permit Holder.

Copies of all shipping documents must be sent to the RSS for placement in the archive file maintained for all sealed radioactive sources.

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**Records
Retention**

All documents relating to the purchase, transfer, or disposal of a leak test must be retained by the Permit Holder for as long as their permit is active.

The Radiation Safety Staff maintains records of the purchase, transfer, and disposal of ECDs as long as the Department's radioactive materials license is active.

Records of leak tests must be retained for three years. Both the permit holder and the Radiation Safety Staff must retain these records.

Questions

If there are any questions regarding the information in this document, contact:

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Approved:

3/11/96

Date

By:

/s/

John T. Jensen

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